IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A safety protection instrumentation system for a nuclear reactor constructed by using a digital logic, wherein the digital logic ~~includes~~ comprises:

a plurality of functional units having logic circuitry in which output logic patterns ~~corresponding to all~~ resulting from input logic patterns [[are]] have been verified in advance of installation of the logic circuitry in the safety protection system; and

a functional module formed by combining the plurality of functional units so as to form a logic structure in which the logic structure of the combination of the plurality of functional units is different from the logic structure of each of the plurality of functional units individually.

Claim 2 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein, each of the functional units individually implements the output logic patterns ~~corresponding to all~~ resulting from the input logic patterns solely on hardware, and determines whether the output values coincide with predicted values calculated from design specifications.

Claim 3 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein the functional module includes only [[the]] functional [[unit]] units having a same logic circuit gate structure as that of [[the]] a functional unit whose performance [[is]] has been verified in advance.

Claim 4 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein the functional module formed by a combination of the plurality of functional units ~~includes~~ further comprises:

a register ~~thorough~~ through which an output from [[the]] at least one functional unit is transmitted; and

a delay element used for adjusting the timing of signal processing in the functional unit.

Claim 5 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein the functional module formed by a combination of the plurality of functional units ~~includes~~ further comprises:

a register ~~thorough~~ through which an output from [[the]] at least one functional unit is transmitted, [[and]]

wherein the system uses handshaking for transferring a signal ~~between~~ from the functional unit that drives the register at different clock frequencies, among the functional units.

Claim 6 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein the safety protection instrumentation system ~~includes~~ further comprises:

software [[in]] which describes effective programs statements executed by hardware and input pattern groups indicating operation paths ~~are described~~, uses branch coverage or toggle coverage [[used]] for evaluating the ratio of the input logic patterns or determining whether the number of the input patterns is sufficient, and determines whether the output

logic patterns corresponding to the input logic patterns coincide with predicted patterns calculated from design specifications to verify the connection between the functional units.

Claim 7 (Original): The safety protection instrumentation system according to claim 1, wherein the safety protection instrumentation system is structured so as to generate input patterns in accordance with design specifications of the functional module and to determine whether the output patterns corresponding to the input patterns in the functional module coincide with predicted values calculated from the design specifications.

Claim 8 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein the safety protection instrumentation system ~~includes~~ further comprises:

an analog-to-digital element that converts an analog signal pattern in accordance with design specifications of the functional module into a digital value to generate a digital input pattern; and

a digital-to-analog element that converts an output corresponding to an input in the functional module into an analog value, [[and]]

wherein the system determines whether the analog value coincides with a predicted value calculated from the design specifications.

Claim 9 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein the safety protection instrumentation system performs addition or comparison of two variables in the functional unit to replace either one of the two variables with a constant that can be specified with an address having [[the]] a number of bits smaller than that of the variable.

Claim 10 (Currently Amended): The safety protection instrumentation system according to claim 1,

wherein the functional unit has a function of passing an operation flag indicating normal completion of the operation,

wherein the functional module has a function of monitoring the operation flag, and

wherein the safety protection instrumentation system ~~includes~~ further comprises:

a trip evaluator that receives an output from the functional module and determines whether the operation flag is set; and

an abnormality diagnosis circuit that outputs an abnormal operation signal if the operation flag is not set.

Claim 11 (Currently Amended): The safety protection instrumentation system according to claim 1,

wherein the functional unit has a function of calculating maximum and minimum output values by a simple expression and a function of passing the maximum and minimum output values, and

wherein the safety protection instrumentation system ~~includes~~ further comprises:

a trip evaluator that compares signal values with the maximum and minimum output values to determine whether the signal values are appropriate; and

an abnormality diagnosis circuit that outputs an abnormal operation signal.

Claim 12 (Currently Amended): The safety protection instrumentation system according to claim 1, wherein the safety protection instrumentation system ~~includes~~ further comprises:

a first safety protection instrumentation system that converts a digital output into an analog value and converts the analog value into an optical signal; and

a second safety protection instrumentation system that converts the optical signal into an analog value and converts the analog value into a digital value, [[and]]

wherein the first safety protection instrumentation system is connected to the second safety protection instrumentation system.

Claim 13 (Currently Amended): A method of operating a safety protection instrumentation system for a nuclear reactor constructed by using [[a]] digital logic, ~~wherein~~ comprising:

verifying output logic patterns ~~corresponding to all~~ resulting from input logic patterns in functional units in the safety protection instrumentation system ~~are verified~~ in advance of installation of the logic circuitry in the safety protection system; and

combining a plurality of functional units to form a functional module so as to form a logic structure in which the logic structure of the combination of the plurality of functional units is different from the logic structure of each functional unit individually.

Claim 14 (Currently Amended): The method of operating a safety protection instrumentation system according to claim 13, ~~wherein~~ further comprising:

serially performing data processing in the functional units in the safety protection instrumentation system ~~is serially performed~~ in the order of connection; ~~, and the~~

confirming serial transmission of a signal ~~is confirmed~~ by monitoring an output timing; and

~~it is determined~~ determining whether the signal is output as designed to verify the performance of the safety protection instrumentation system.

Claim 15 (Currently Amended): The method of operating a safety protection instrumentation system according to claim 13, further comprising: ~~the step of~~

verifying whether the functional units in the safety protection instrumentation system have a same structure as an internal structure when performance of the functional units is verified.